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### PROVISIONAL SPECIFICATION

#### Improvements in or Relating to Nails or the Like

I, ANTHONY COONEY, a British Subject, of 44, McBride Street, Garston, Liverpool, 19, in the County of Lancaster, do hereby declare the nature of this invention to be as follows:—

The present invention relates to nails and the like.

The object of the invention is to provide a nail or the like which is capable of securing wood or wood-like material to metal, such as sheet metal which is capable of being pierced by a nail. It is not difficult to nail a piece of sheet metal to a piece of wood since the metal is secured to the wood by means of the head of the nail. Where however, it is desired to secure wood to sheet metal by driving a nail first through the wood and then through the metal, the connection between the wood and the sheet metal will remain insecure unless the nail is bent over or cleated at its sharp end.

The present invention provides a nail or the like which is capable of effecting a more secure connection between a piece of wood or the like material and a metal sheet or sheet metal object, which nail consists of a metal strip of non-circular cross-section which is twisted about its own axis to provide helical flutes, flats or the like or in other words the strip material is twisted about its own axis to cause the cross sectional shape thereof to change its angular direction progressively along the length of the strip.

The nail or strip of the present invention should be provided with a point. It may be provided with a head but a head is not essential.

It will be appreciated that as the nail is driven through a piece of wood and through a metal sheet or sheet metal element and there-beneath it will twist

about its longitudinal axis during the driving operation, and will make in the sheet metal an aperture of cross section roughly corresponding to the cross section of the nail or strip which aperture will occupy an angular direction corresponding to the angular direction of the cross section of that part of the nail which is in the aperture. The cross section of that part of the nail beneath the aperture will lie at a different angle to that of the aperture and thereby the nail and the wood through which it has passed, will be locked to the sheet metal, and can only be separated therefrom by twisting of the nail about its longitudinal axis or by enlargement or deformation of the aperture.

The invention is particularly useful for example in securing floor boards to joists or beams of hollow sheet metal construction or in securing wooden slate battens to hollow sheet metal rafters or roof supports.

The degree of twist applied to the nail or strip i.e. the length of the pitch of the helix so formed should be suitable to enable the nail to twist without difficulty as it is being driven into the wood. An unduly short pitch might cause the nail to tear through the wood without twisting or without twisting sufficiently whilst an unduly long pitch might allow a certain looseness in the connection between two elements nailed together. A suitable pitch can be readily ascertained by trial and error and may vary in accordance with the size of the nail or strip, the shape of the cross section and the purpose for which it is to be used.

Dated this 20th day of February, 1946.

W. P. THOMPSON & CO.,

12, Church Street, Liverpool, 1.  
Chartered Patent Agents.

### COMPLETE SPECIFICATION

#### Improvements in or Relating to Nails or the Like

I, ANTHONY COONEY, a British Subject, of 44, McBride Street, Garston, Liverpool, 19, in the County of Lancaster, do hereby

declare the nature of this invention and in what manner the same is to be performed, to be particularly described and

ascertained in and by the following statement:—

The present invention relates to nails and the like, and more particularly to

5 screw nails.

The object of the present invention is to provide a screw nail which is not only capable of nailing wooden elements securely together, and of securing metal

10 sheet to wood or wood-like material but is also suitable for securing wood to sheet metal where the nail is driven first through the wood and then through the metal.

15 The present invention consists of a screw nail formed of relatively flat or oval section material so that only two flutes are formed along the length of the nail.

20 It is found that screw nails made according to the present invention from oval or relatively flat section material so as to form only two flutes along the nail have a reduced tendency to split or

25 otherwise damage a wooden element into which they may be driven, and also have a reduced tendency to split the edges of the rags which are formed in a metal element when the nail is driven

30 therethrough, with the result that the rags adhere relatively closely to the nail and afford a relatively tight connection between the nail and the metal through which it is driven. The latter feature is

35 of special importance in the securing of wood to sheet metal when the nail passes first through the wood and then through the metal.

40 It will be appreciated that if a nail were passed through a thin metal sheet having a prepared clean opening of section corresponding to the cross sectional shape of the nail, the nail would

45 be engaged by the thin edge of the metal sheet so that the nail would probably be able to tilt when in the opening, and would probably not enjoy a secure and tight connection with the metal sheet.

50 When a nail is driven through a metal sheet, the driving of the nail through the sheet causes a rag or burr to be formed around the opening so formed in the sheet and the rag has a certain

55 depth taken in the longitudinal direction of the nail. Such rag tends to split at various points on its edges as the nail is driven through and the splitting enables the rag to curl outwards away from the surface of the nail. If the rag

60 can be prevented from splitting or if the splitting can be minimised then the rag will have a greater tendency to adhere to the surface of the nail and form a firmer connection between the nail and

the sheet. It is found that screw nails

formed of relatively oval or flat section material do minimise the degree of splitting of the rag and as a rule cause only two splits of relatively moderate degree.

70 The point of a cut nail or oval section usually has four short divergently inclined ridges. It is found that by rounding off these ridges the splitting of the rag, referred to above, is still

75 further reduced and a further feature of the invention therefore consists in a screw nail formed of oval or relatively flat section material and having a ridgeless point.

80 Nails of the present invention may be provided with heads or not, as may be required, and for certain purposes where it is desirable that the nails should be

85 capable of being withdrawn, the nails may be provided with slotted heads to enable them to be engaged by a screw-driver.

The invention is more particularly described with reference to the accom-

90 panying drawings in which:—

Fig. 1 illustrates a screw nail of oval section driven through a metal sheet.

Fig. 2 illustrates a nail similar to Fig. 1 with a rounded or ridgeless point.

95 Fig. 3 illustrates the cross sectional shape of the nails shown in Figs. 1 and 2.

Fig. 4 illustrates a nail having a slightly different cross sectional shape.

Fig. 5 illustrates the cross sectional

100 shape of the nail shown in Fig. 4.

Fig. 6 illustrates a nail similar to the nail of Fig. 1 but provided with a slotted head.

The nail 10 shown in figure 1 is

105 formed of oval section material, as illustrated in figure 3, and is similar to an ordinary oval nail except that it is

110 twisted to form a screw nail. The point of the nail 10 has opposed long edges or ridges 11 at its point and short edges

12. The nail is shown as having been driven through a metal sheet 14. The

driving of the nail through the sheet 14 has produced a rag 15 which has split

115 at its edge to a moderate extent as at 16, and which curls slightly away at its edge from the surface of the nail as at

17. The rag thus has a considerable depth of adherence to the surface of the

120 nail.

In the nail shown in fig. 2 the ridges at the point have been rounded off to

effect a reduction in the splitting of the rag 20 and to afford an increase in the

125 degree of its adherence to the surface of the nail.

The nail shown in fig. 4 is formed of flat section material having opposed

edges 22 which provide somewhat sharp-

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edged flutes as illustrated at 24.

Fig. 6 illustrates a nail similar to fig. 1 except that it is provided with a slotted head 25 which can be engaged by a screwdriver.

The degree of twist applied to the nail i.e. the length of the pitch of the helix formed therein should be suitable to enable the nail to twist without difficulty as it is being driven into the wood. An unduly short pitch might cause the nail to tear through the wood without twisting or without twisting sufficiently whilst an unduly long pitch might allow a certain looseness in the connection between two elements nailed together. The pitch may vary in accordance with the size of the nail, the shape of the cross section thereof, and the purpose for which it is to be used.

The invention is especially applicable to the securing of a wooden element to a sheet metal element when the nail is driven through the wooden element first. In this application, it will be appreciated that as the nail is driven through the wood and through the metal sheet therebeneath it will twist about its longitudinal axis and will make in the sheet metal an aperture of cross section roughly corresponding to the cross section of the nail. This aperture will occupy an angular direction corresponding to the angular direction of the cross section of that part of the nail which is in the aperture. The cross section of that part of the nail beneath the aper-

ture will lie at a different angle to that of the aperture and thereby the nail and the wood through which it has passed, will be locked to the sheet metal, and can only be separated therefrom by twisting of the nail about its longitudinal axis or by enlargement or deformation of the aperture.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—

1. A screw nail formed of oval or relatively flat section material, and having only two flutes along its length.

2. A screw nail as claimed in claim 1 having a rounded point.

3. A screw nail as claimed in claim 1 or 2 of flat rhomboidal cross section providing relatively sharply edged flutes.

4. Screw nails as particularly described with reference to the accompanying figures 1 and 3.

5. Screw nails as particularly described with reference to the accompanying figures 2 and 3.

6. Screw nails as particularly described with reference to the accompanying figures 4 and 5.

7. Screw nails as particularly described with reference to the accompanying figures 3 and 6.

Dated this 2nd day of October, 1946.

W. P. THOMPSON & CO.,

12, Church Street, Liverpool, 1.  
Chartered Patent Agents.

[This Drawing is a reproduction of the Original on a reduced scale.]

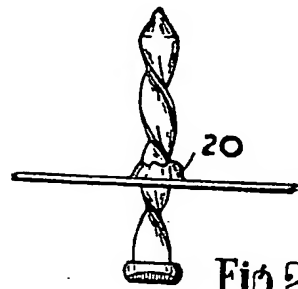


Fig. 2.

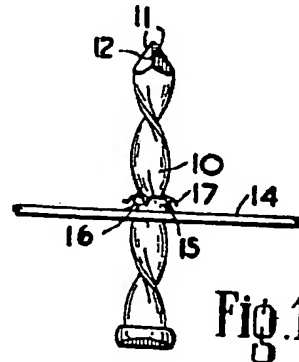


Fig. 1.



Fig. 4.



Fig. 6.



Fig. 3.



Fig. 5.

